Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Actions to Accelerate Adoption and Accessibility of	)	GN Docket No. 16-46
Broadband-Enabled Health Care Solutions and Advanced	)	
Technologies	)	

COMMENTS OF NOKIA

Nokia respectfully responds to the Commission's Public Notice seeking comment

and data on actions the Commission can take to accelerate the adoption and accessibility of

broadband-enabled health care solutions and advanced technologies.

I.   INTRODUCTION AND SUMMARY

Nokia commends the Commission and the Connect2Health Task Force for

seeking to maximize the availability of broadband connectivity to all Americans, and identifying

practical actions to promote access to 21st century health care. The Public Notice is an important

vehicle for global stakeholders, such as Nokia, to provide the Commission with an understanding

of the state of broadband-enabled health care solutions and the ecosystem to promote access and

adoption of these technologies.

To address the various objectives set forth in the Public Notice, Nokia first

provides an overview of our suite of connectivity solutions, including devices and analytics,

Cloud and network infrastructure. These Comments then present a White Paper (included as

Attachment 1) authored by Nokia Health Division that describes how Nokia connected devices

are radically changing the health care landscape, providing patients with unprecedented

information to participate in their own care while taking fewer trips to the doctor.

Next, we present a Nokia co-authored report, issued by the United Nations Broadband Commission on Sustainable Development and its Working Group on Digital Health (included as <u>Attachment 2</u>), which surveys studies of digital health national strategies in 21 countries, and provides lessons learned from the experiences in those countries. In sum, the report calls for government leadership and cross-sector collaboration to reap the full benefits of connected health care.

II. **NOKIA'S LEADERSHIP ROLE IN PROMOTING CONNECTED HEALTH: CONNECTED DEVICES, CLOUD, AND 5G**

Powered by the research and innovation of Nokia Bell Labs and Nokia Technologies, Nokia serves communications service providers, governments, large enterprises and consumers, with the industry's most complete, end-to-end portfolio of products, services and licensing. From the enabling infrastructure for 5G and the Internet of Things, to emerging applications in virtual reality and digital health, we are shaping the future of technology to transform the human experience. A truly global company, we are 160 nationalities working in more than 100 countries.

Nokia has made strong commitments to the digitalization of health care, with the aim to provide quality and low cost access to all citizens. As our CEO, Rajeev Suri, has stated: "Digital health is on the cusp of becoming an essential part of the health care equation: first, through medical-grade and doctor-approved products that inspire individuals to take control of their own health. Then, by using the data generated by these products to inform powerful

research, leading to actionable insights that can benefit all."[1] Nokia plays a role in each of these major facets of the technology equation:

Connected Health Devices. In 2016, Nokia acquired Withings, a company known for design and innovation in connected health devices, such as the first Wi-Fi scale on the market (introduced in 2009), a U.S. Food and Drug Administration- (FDA-) cleared blood pressure monitor, a high-definition wireless security camera, a smart sleep system, and a line of automatic activity tracking watches. Withings is now part of Nokia Technologies' Digital Health unit (and will soon be rebranded under the "Nokia" name).

Beyond producing the devices that monitor and track health, Withings also has pioneered the "Withings Health Observatory," an open source platform that permits aggregation of de-identified healthcare data from individual users at a country-level, streamed in real time. For example, this innovation was used to measure obesity in cities across France, and as a result, a series of public health campaigns were launched using Nokia's Steps Challenge Platform against diabetes and obesity. With this acquisition, Nokia is positioned in the Internet of Things in a way that leverages the power of our trusted brand, fits with our company purpose of expanding the human possibilities of the connected world, and puts Nokia at the heart of an industry space where we can make a meaningful difference in peoples' lives.

Cloud. The rising digital expectations of practitioners and patients have placed pressure on health care technologies and government leaders. Unlike other industries, health care faces strict requirements related to patient privacy and data protection, posing greater risks

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[1] Rajeev Suri, *One of the most consequential and important challenges of our time*, *Managing the health of our collective society*, May 2, 2017, available at: https://blog.networks.nokia.com/ehealth/2017/05/02/one-consequential-important-challenges-time.

to infrastructure transformation and data security. Cloud is a foundational framework for building, deploying, and operating digital healthcare. An agile, automated, and programmable infrastructure, cloud can mean faster innovation and enhanced workflows. It offers access to greater knowledge for better patient care, and it maintains the security and governance required.

Cloud solutions can be implemented in different ways through public, private, and hybrid models. Health care organizations, governments, and other institutions can deploy cloud models that best match their requirements for security, cost, and operational flexibility. Designing a private cloud should always be done with hybrid interoperability in mind, using open standards to futureproof the evolutions of infrastructure in the digital health care sector.

Nokia cloud solutions are enabled by software-defined networking (SDN) to meet the unique and challenging requirements of the healthcare sector, including parts of the sector that are managed by government, and can support development and roll into operations, integrate a disparate range of devices and gear, and ensure rigid security. SDN reduces operations complexities and adapts to the dynamic nature of cloud-based consumption models.

Next Generation Networks. Today's networks already support a number of connected-health use-cases. Further network innovations, however, will be required to fully realize Nokia's health care vision. 5G aims at supporting the projected exponential growth of machine-to-machine communications and the Internet of Things ecosystem, which includes the digital health care ecosystem. 5G will improve flexibility, lower costs and lower consumption of energy. 5G will offer an expected peak data rate higher than 10 Gbit/s compared to the 450 Mbit/s LTE can offer today. Speed combined with virtually zero latency (i.e. less than 1 ms) will result in a radio interface that will not be the bottlenecked for the most challenging use-cases. These next-generation network technologies will be reliable and quick enough for mission-

critical wireless control and automation tasks that current networks are not asked to support, such as that required for remote surgery and many other tasks yet to be imagined.

III.   CONNECTED DEVICES ARE REVOLUTIONIZING HEALTH CARE

Nokia believes that mobile health (m-health) will revolutionize the concept of health care, from a technological and social standpoint and beyond. Healthcare professionals will continue to monitor patients, but patients will be empowered to take their healthcare needs into their own hands. As the mobile or digital health care ecosystem matures and solutions scale up, preventive care and early intervention will take center stage, reducing spending on chronic conditions and high-cost emergency room visits, bringing efficiency and quality of health care to all.

To bring the future of connected health into sharp focus, Nokia Health Division authored its White Paper on Connected Health (Attachment 1). The White Paper describes in detail the changes that arise with m-health in general, and connected devices in particular. In this new paradigm, there is an increasing interest in healthy individuals, not with the purpose of simply treating or curing them, but helping them to manage their health better and prevent diseases from occurring, supported by cost effective remote monitoring.

As the White Paper notes, the increasing miniaturization of sensors and the spread of smartphones have spurred the growth of new tools, which make it easier for people to monitor their health data on-the-go and share it with medical professionals if they so choose. Connected scales, pedometers and blood pressure monitors are easily accessible. Over 100,000 smartphone health applications have been released, from coaching to prevention, screening, diagnosis, monitoring, therapeutic education, adaptation of care and orientation toward treatments.

These tools have a unique impact on proper treatment of chronic diseases, such as asthma or diabetes, where constant self-evaluation and monitoring may become a way of life for the patient. Patients with chronic diseases must not only anticipate complications, but also take action if they occur. They must also learn to assess their own situation in order to decide whether to call a doctor. Connected devices that monitor and track relevant aspects of a patient's health, such as weight, activity, glycemic index, etc., not only empower the patient to take control of their day-to-day care, but provide physicians with a much greater data set to care for the patient.

In addition to describing the current innovations in connected health, the White Paper makes a number of recommendations on how to speed up the deployment of m-health.

First, the White Paper urges that we encourage greater adoption by doctors through continued investment in experimentation and certification demonstrating the efficacy of connected healthcare innovations. Much of the connected health revolution has been spurred by the viral popularity of consumer-grade fitness trackers. More needs to be done, however, to train doctors on connected devices and how to integrate them into a treatment plan.

Second, especially as we enter the realm of where technical flaws can lead to serious diagnostic or therapeutic errors, greater adoption will depend on doctor and consumer confidence about device reliability and data security. Nokia recommends that such devices be certified before being introduced on the market, such as the Nokia blood pressure monitor, approved by the FDA in the U.S. Consumer confidence will also require assurances regarding safety and confidentiality of data.

Third, the financial and regulatory framework must adapt to encourage greater adoption of connected devices. For example, insurance should put greater emphasis on funding

preventative care. It is far more expensive to treat disease than to encourage wellness in the first place. Similarly, hospitals should promote remote care options that could shorten hospital stays and avoid readmissions.

The White Paper also references several studies that demonstrate the concrete benefits of connected devices, from weight control, to blood pressure control, to increasing physical fitness activity and beyond. Even something as simple as automated text messaging can facilitate patient care through reminders, for example, to follow a prescribed drug regimen.

IV.   GOVERNMENT LEADERSHIP AND A COLLABORATIVE APPROACH IS ESSENTIAL TO CONNECTED HEALTH

Reaping maximum benefits of connected health care to all citizens requires a collaborative approach among a diverse array of traditional and non-traditional stakeholders. Nokia believes the Commission can play a key role in this effort by enabling collaboration between technology providers, health organizations, financial institutions, and other government stakeholders. In line with this approach, the Broadband Commission Working Group on Digital Health, chaired by Nokia and the Novartis Foundation, convened leading digital health experts from governments, international and non-governmental organizations, academic institutions and the private sector for the purpose of producing a report: Digital Health: A Call for Government Leadership and Cooperation between ICT and Health (Attachment 2).

To produce the report, Nokia and its coauthors engaged in a review of existing literature and case studies. This review identified twenty-one countries with unique attributes of digital health: Bangladesh, Brazil, Canada, Chile, Estonia, Gabon, Ghana, India, Kenya, Malawi, Malaysia, Mali, Mexico, Nigeria, Norway, Pakistan, the Philippines, Rwanda, Singapore, South Africa, and Uruguay. These countries represent a range of demographic, geographic and economic contexts with varying levels of maturity in digital health systems.

The Report finds that the catalyst for developing a national digital health strategy may be different in each country. However, there were three key observations and best practices that were identified across all case studies.

1. Sustained senior government leadership and committed financing for digital health are prerequisites for a successful national digital health strategy. Initiating and operationalizing a national digital health strategy can take several years, requiring a long-term commitment. A strong vision is critical, supported by senior government leadership that can articulate the value and potential impact of digital health and ensure the buy-in and alignment of stakeholders. Endorsement and leadership across sectors are needed, both from health leaders who recognize the transformative potential of technology in healthcare and from ICT leaders who understand the potential of digital technology to address health challenges. Commitment from those leaders can consolidate sustainable financial support and the resources for a digital health strategy. It will also prompt the establishment of dedicated, credible and resourced governance structures which can help to build strong and competent managerial teams.

2. Effective governance mechanisms that engage stakeholders, who have clearly defined roles, can help to ensure efficient decision-making for a national digital health strategy. Governance mechanisms formalize decision-making and provide a forum for discussion, and bring together leaders and stakeholders from overlapping domains. They clarify how and when external stakeholders, from the private sector or the development community, can provide input, and they promote the drafting of a digital health strategy by creating management units.

3. A national ICT framework that facilitates alignment between health and ICT sectors can promote connectivity and interoperability, establish common standards, and

enable appropriate policies and regulations in digital health. Digital health lies at the

intersection of health and ICT. A strong government-wide ICT framework will enable shared

capital investments, rationalized resource allocations, and leveraged workforce capabilities

between government entities, while at the same time avoiding duplication of solutions. Coupling

digital health efforts to national ICT frameworks, such as national broadband plans or national

digital plans, can enhance cooperation.

Dual expertise is needed in technology and health, and there is also little doubt

that greater dialogue and cooperation between the health and ICT sectors will result in more

effective use of investments and funding. For example, in the U.S. context, Nokia recommends

the Commission to work closely with other Agencies, such as the Department of Health and

Human Services, and the FDA to consider how connected health is impacted by agency approval

processes, the legal framework for Patient Generated Health Data, and how insurance benefits

might account for preventative m-health applications such as remote monitoring.

VIII.   CONCLUSION

Mobile health devices coupled with Cloud and 5G connectivity are poised to disrupt the health care ecosystem. Nokia respectfully requests that the Commission considers the recommendations of the Nokia White Paper and the Nokia coauthored UN Broadband Report. Connectivity is the main thread that connects these transformative technologies. A collaborative effort from government stakeholders, such as the Commission, will be crucial to harmonizing diverse technologies and disparate regulatory frameworks to bring the power of connected health care to all Americans.

Respectfully submitted,

Nokia

/s/_____
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May 24, 2017